

Lithography Groundrule

Figure 1

PREDICTED vs ACTUAL COST COMPARISON OF TECHNOLOGY COST ESTIMATE WORKSHEET

TECHNOLOGY	NAME	PREDICTED	ACTUAL	% DELTA
CM4L 3LM	OMNI	\$872	\$833	4.7%
CM4LP 3LM	PHEONIX	\$805	\$856	-6.0%
CM5S 4LM	MUSTANG	\$1,188	\$1,121	6.0%
CM5S1 5LM	RACER	\$1,236	\$1,227	0.7%
CM5X 4LM	APACHE	\$1,191	\$1,152	3.4%
CM5X2 4LM	FURY	\$1,248	\$1,167	6.9%
CM6S 4LM	HURRICANE	\$1,322	\$1,340	-1.3%
CM6S2 4LM	TIGGER	\$1,407	\$1,299	8.3%
CM6S2 5LM	SC / 98	\$1,560	\$1,469	6.2%
CM6SF 4LM	PYTHON	\$1,531	\$1,437	6.5%
CM6SF 5LM	LONGTRAIL	\$1,816	\$1,691	7.4%
CM6X 4LM	TYPHOON	\$1,704	\$1,670	2.0%
CM7S 6LM	LONESTAR	\$2,464	\$2,607	-5.5%
CM7SF 3LM	COMMANDER	\$1,918	\$2,020	-5.0%
CM8S 4LM	BLIZZARD	\$2,238	\$2,240	-0.1%
SIGE6SF	COPERNICUS	\$2,809	\$2,726	3.0%
ICEC8S2 6LM	MAJESTIC *	\$3,214	\$3,325	-3.3%
ICEC9S 7LM	MAKO **	\$3,870	\$3,534	9.5%

* Predictive Cost Estimated 12 Months Prior to Actual

** Predictive Cost Estimated 18 Months Prior to Actual

FIGURE 2

TECHNOLOGY COST ESTIMATE WORKSHEET

FOR THE FOLLOWING TECHNOLOGIES

CMAS, CML, CML2, CMK, CMK2, CMK3, CMK4, CMK5, CMK6, CMK7, CMK8, CMK9, CMK10, CMK11, CMK12, CMK13, CMK14, CMK15, CMK16, CMK17, CMK18, CMK19, CMK20, CMK21, CMK22, CMK23, CMK24, CMK25, CMK26, CMK27, CMK28, CMK29, CMK30, CMK31, CMK32, CMK33, CMK34, CMK35, CMK36, CMK37, CMK38, CMK39, CMK40, CMK41, CMK42, CMK43, CMK44, CMK45, CMK46, CMK47, CMK48, CMK49, CMK50, CMK51, CMK52, CMK53, CMK54, CMK55, CMK56, CMK57, CMK58, CMK59, CMK60, CMK61, CMK62, CMK63, CMK64, CMK65, CMK66, CMK67, CMK68, CMK69, CMK70, CMK71, CMK72, CMK73, CMK74, CMK75, CMK76, CMK77, CMK78, CMK79, CMK80, CMK81, CMK82, CMK83, CMK84, CMK85, CMK86, CMK87, CMK88, CMK89, CMK90, CMK91, CMK92, CMK93, CMK94, CMK95, CMK96, CMK97, CMK98, CMK99, CMK100

TECHNOLOGY

PHOTO GROUND RULE

CURRENTLY IN PRODUCTION Y OR N

← 301
 ← 302 300
 ← 303

IF "N" 10% CONTINGENCY ADDED

FEOL BASE COST EXCLUDES: BR, KV, TAILORS, DUAL GATE, AND/OR LEVELS

FULL CAPACITY COST

MATURE FULL CAPACITY COST

FEOL BASE COST

FEOL OPTIONAL LEVELS:

BR RESISTOR
 KV LEVEL
 TAILOR VTS
 DUAL GATE
 OP RESISTOR
 EDRAM OPTION:
 (U1, ALAW, P1)

Y or N	# OF MASK
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
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FEOL OPTIONAL COST

TOTAL FEOL COST WITH OPTIONS

312 →
 313 →
 314 →
 315 →
 316 →
 317 →
 318 →
 319 →
 320 →

BEOL BASE COST EXCLUDES: MC, MIM CAPACITOR, AND TD LEVELS
 BASED ON 4 THIN LEVELS OF METAL

FULL CAPACITY COST

MATURE FULL CAPACITY COST

BEOL BASE COST

DELETE METAL LEVELS:

For products with LESS than 4LM
 Indicate type of metal and # of levels

Aluminum
 Thin Copper
 Thick Copper

Y or N	# OF LOM
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

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<input type="text"/>
<input type="text"/>
<input type="text"/>

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<input type="text"/>

ADD METAL LEVELS:

For products with MORE than 4LM
 Indicate type of metal and # of levels

Aluminum
 Thin Copper
 Thick Copper

Y or N	# OF LOM TO ADD
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

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BEOL BASE COST WITH LEVEL OF METAL ADJUSTMENTS

Y or N

BASE COST ADDER FOR COPPER

EXCLUDED ADJUSTMENT FOR TEMPERATURE

ADDITIONAL BEOL LEVELS:

Y or N

MC LEVEL
 MIM CAPACITOR
 TD LEVEL

ADDITIONAL BEOL LEVELS

321 →
 322 →
 323 →
 324 →
 325 →
 326 →
 327 →
 328 →
 329 →
 330 →
 331 →
 332 →
 333 →
 334 →
 335 →
 336 →
 337 →
 338 →
 339 →
 340 →
 341 →
 342 →

TOTAL BEOL COST WITH OPTIONS

COST SUMMARY

	PLAN FULL CAPACITY COST	MATURE FULL CAPACITY COST
BASE COST	\$0 - 313	\$0 - 314
OPTIONAL COST	\$0 - 317	\$0 - 318
RAW WAFER	\$0 - 351	\$0 - 352
SUPER COMMON	\$0 - 353	\$0 - 354
SUB TOTAL	\$0 - 355	\$0 - 356
CONTINGENCY OF 10% (NOT CURRENTLY IN PRODUCTION)	\$0 - 357	\$0 - 358
TOTAL PREDICTED COST	\$0 - 359	\$0 - 360

*Shaded boxes need input

Figure 3

FOR

TECHNOLOGY COST ESTIMATE WORKSHEET

<u>Feature</u>	<u>Full Capacity Cost Equation</u>	<u>Mature Cost Equation</u>	<u>Where:</u>	<u>How Derived</u>
FEOL BASE	$Y=272X^{-0.53}$	$Y=241X^{-0.493}$	Y = FEOL Base Cost X = Groundrule	Least Squares Analysis
BEOL BASE	$Y=417X^{-0.486}$	$Y=388X^{-0.461}$	Y = BEOL Base Cost X = Groundrule	Least Squares Analysis
BR RESISTOR	$Y=15.1X^{-0.362}$	$Y=13.5X^{-0.352}$	Y = BR Resistor Cost X = Groundrule	Least Squares Analysis
KV LEVEL	$Y=15.5X^{-0.297}$	$Y=12.5X^{-0.489}$	Y = KV Level Cost X = Groundrule	Least Squares Analysis
TAILOR VTS	$Y=49.8X^{-0.048}$	$Y=45.9X^{-0.0302}$	Y = Tailor VTs Cost X = Groundrule	Least Squares Analysis
DUAL GATE	$Y=38.2X^{-0.803}$	$Y=33.7X^{-0.815}$	Y = Dual Gate Cost X = Dual Gate Levels	Least Squares Analysis
OP RESISTOR	$Y=19.8X^{-0.512}$	$Y=17.9X^{-0.502}$	Y = OP Resistor Cost X = Groundrule	Least Squares Analysis
MC LEVEL	$Y=58.8X^{-0.597}$	$Y=53.9X^{-0.584}$	Y = MC Level Cost X = Groundrule	Least Squares Analysis
METAL LEVELS	$Y=111X^{-0.302}$	$Y=103X^{-0.282}$	Y = Metal Level Cost X = Groundrule	Least Squares Analysis
MIM CAPACITOR	$Y=34.2X^{-0.523}$	$Y=30.8X^{-0.533}$	Y = MIM Cap Cost X = Groundrule	Least Squares Analysis
TD LEVEL	85	77	NA	Direct Measurement
EDRAM	475	450	NA	Direct Measurement
CU ADDER	100	80	NA	Direct Measurement

FIGURE 4

BUR9-2000-0050-US1
TECHNOLOGY COST MODEL OVERVIEW

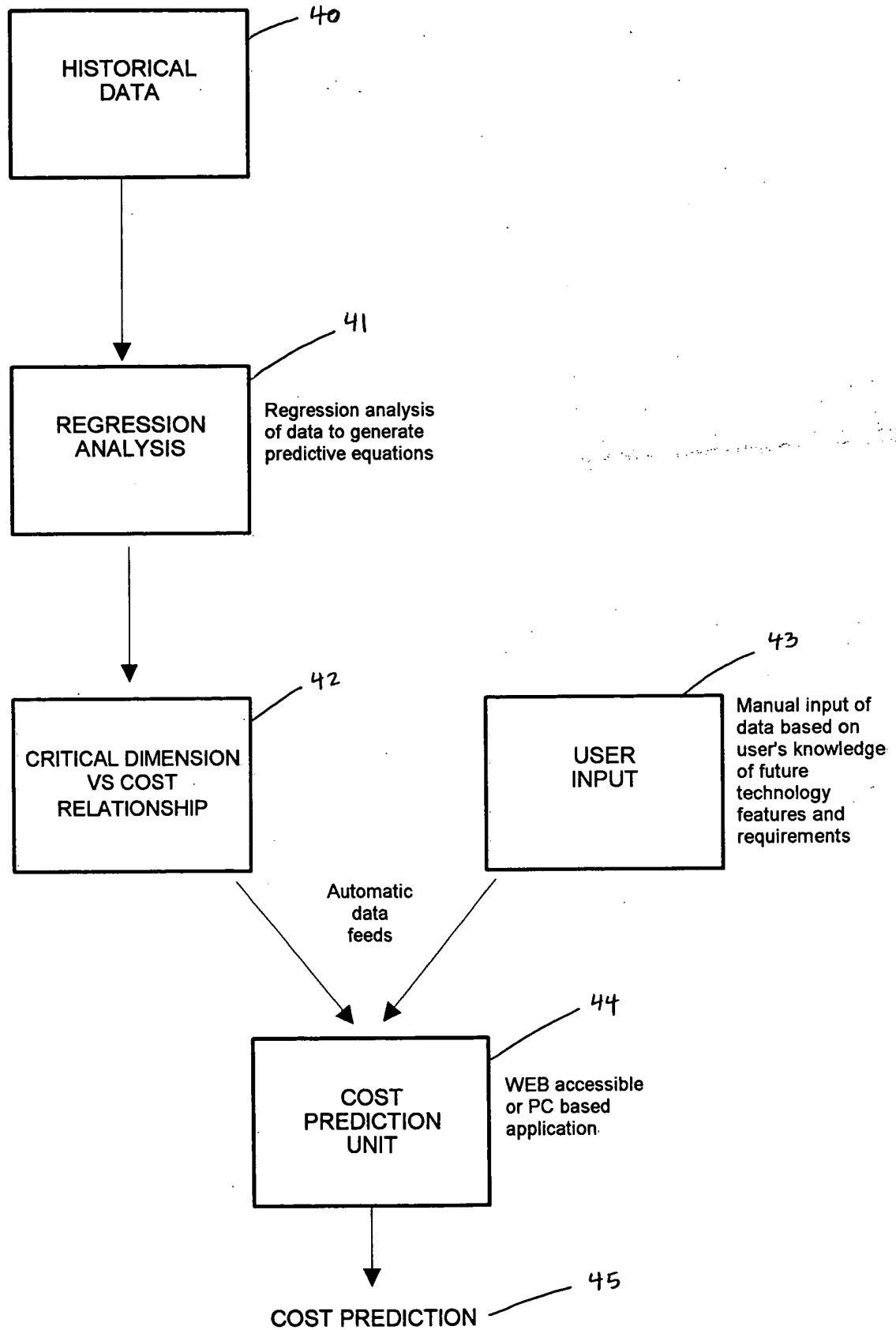


FIGURE 5

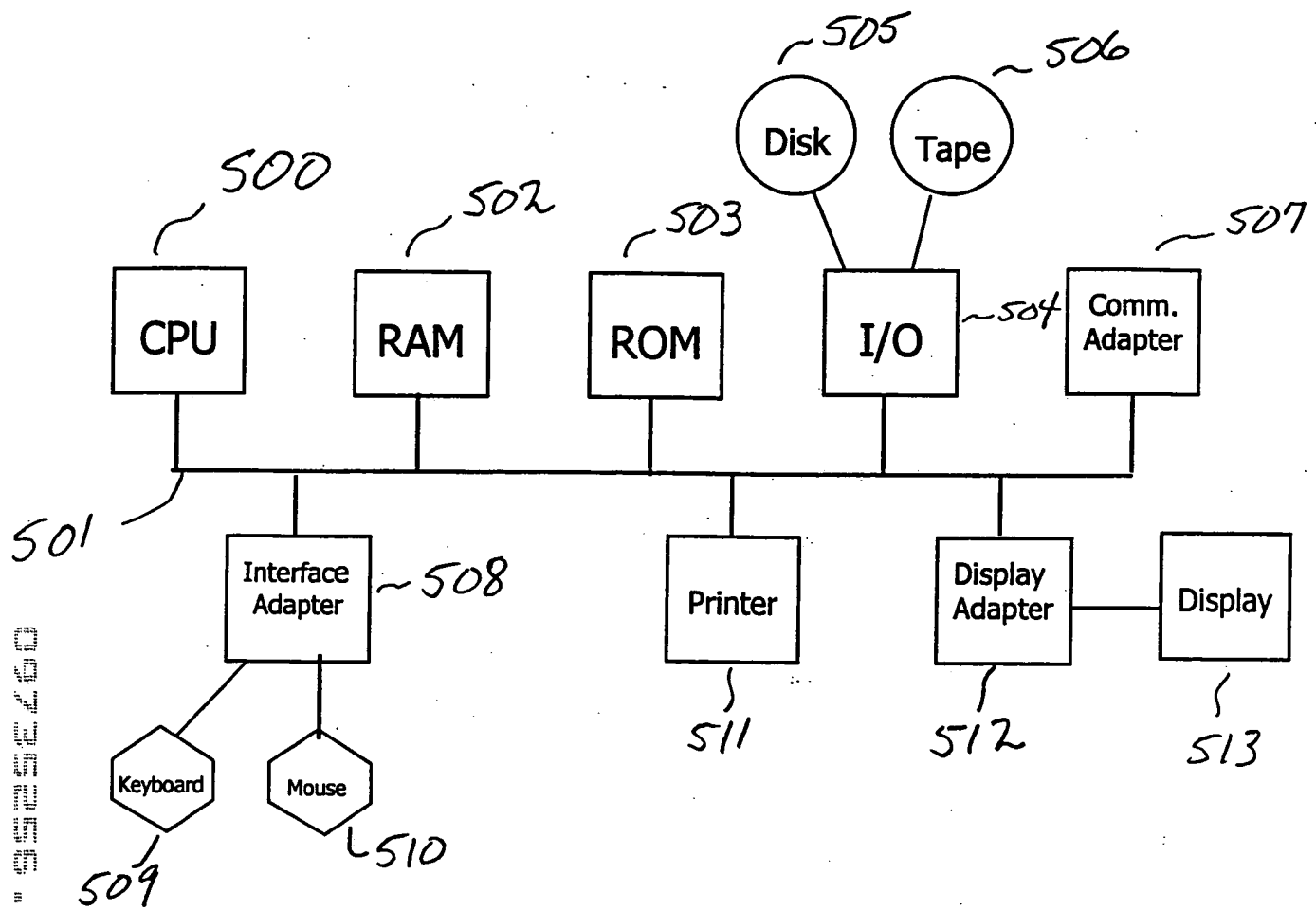


Figure 6